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Canadian Science Advisory Secretariat
Maritimes Region | Science Response 2014/036

LOBSTER (*HOMARUS AMERICANUS*) OFF SOUTHWEST NOVA SCOTIA (LOBSTER FISHING AREA 34): 2014 STOCK STATUS UPDATE

Context

The status of the lobster resource in Lobster Fishing Area (LFA) 34 to the end of the 2011-12 season (May 31, 2012) was assessed in February 2013 (DFO 2013, Tremblay et al. 2013). Fisheries Management has requested "interim information on the status of LFA 34 lobster stocks to maintain the scientific basis for management advice consistent with DFO's Precautionary Approach (PA)". The 2013 assessment identified three key indicators that capture changes in lobster abundance and proposed reference points for each indicator. This Science Response updates these indicators to the end of the 2012-13 fishing season.

This Science Response Report results from the Science Response Process on April 22, 2014, on the LFA 34 Lobster Stock Status Update.

Background

Description of the Fishery

Commercial lobster fishing in LFA 34 (Figure 1), off Southwest Nova Scotia currently has the highest landings and the most participants of any LFA in Canada. Landings in LFA 34 began a long-term increase in the 1980s and recent landings are at record highs (Figure 2). This increase in landings occurred in most lobster stocks in the western Atlantic.

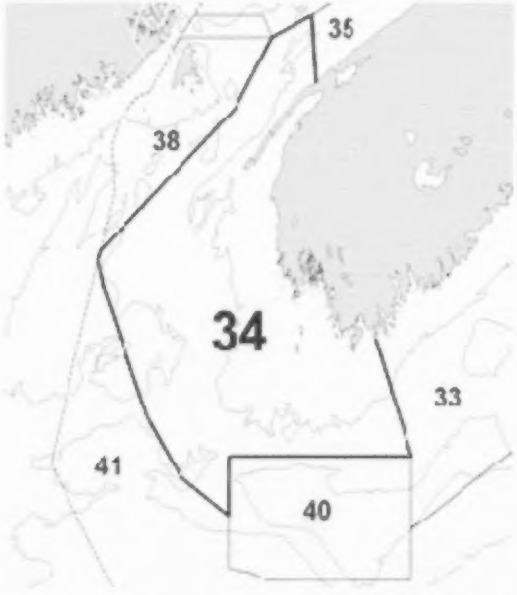

Figure 1. Lobster Fishing Areas (LFA) 34 and adjacent LFAs.

Canada

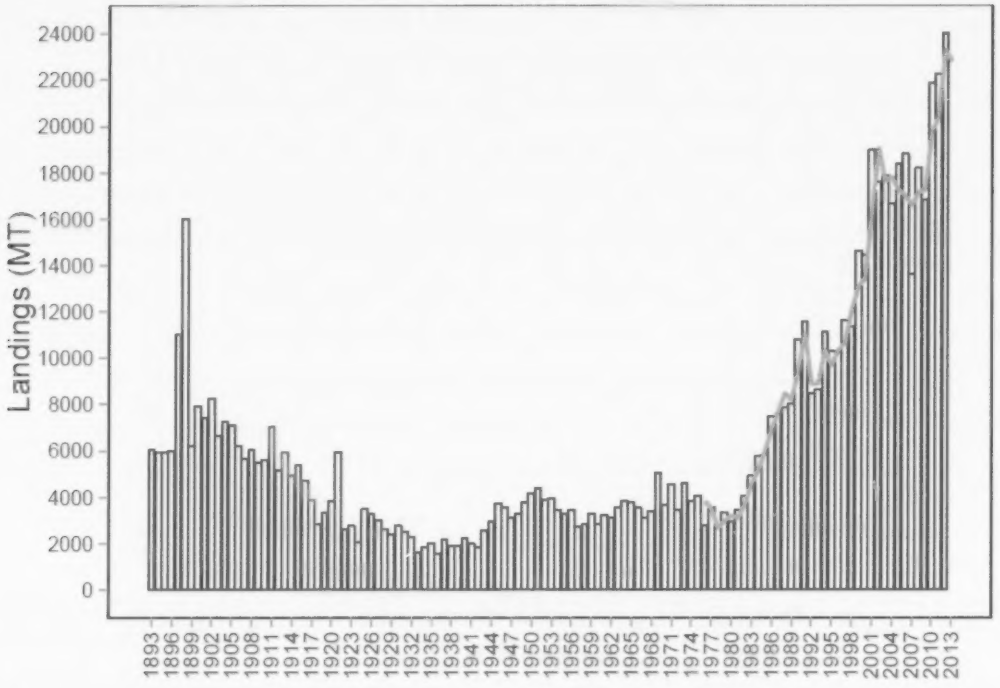

Figure 2. Annual lobster landings by the commercial fishery in LFA 34, 1893 to 2012. Solid line represents seasonal lobster landings, first available for the 1975-76 fishing season (Year 1976 on plot) until present. The fishing season is from the last Monday in November of one year until May 31st of the following year.

The fishery is managed by input controls including a minimum legal size, prohibition on landing of both egg-bearing and V-notched females, limited entry, a season between the last Monday in November through to May 31st, and a trap limit. Other management measures include the requirement for escape vents to allow escapement of sublegal sizes and biodegradable trap mechanisms to mitigate ghost fishing by lost traps.

Analysis and Response

The 2013 LFA 34 assessment (DFO 2013, Tremblay et al. 2013) provided a full analysis of stock health by describing Fishery Performance and providing indicators for Abundance, Fishing Pressure and Reproduction. Spatial variation of these indicators was evaluated. Three primary abundance indicators were identified and associated reference points were tabled. The first abundance indicator was based on landings. Landings-based reference points are part of the current Inshore Lobster Integrated Fishery Management Plan for LFAs 27-38. The basis for these was documented at a Maritimes Region Science Advisory Meeting in 2012 (DFO 2012). It was recognized that using landings as the sole indicator of abundance for lobster stocks has risks, and one of the goals of the 2013 assessment (DFO 2013) was to provide potential alternatives. Two additional abundance indicators and associated reference points were proposed. One was based on commercial catch rate calculated as total landings/total trap hauls in LFA 34. The second was based on the mean number of lobsters per tow in a fishery-independent trawl survey. This survey (the "ITQ" survey) is currently in transition to a lobster-focused survey. The abundance indicators are provided below. All are above the proposed Upper Stock References (USRs); thus, LFA 34 is considered to be in the healthy zone.

Landings and Catch Rate

Seasonal landings for the last 15 fishing seasons (1998-99 to 2012-13) show that recent landings are close to the highest on record (Figure 2, Table 1). The USR for the abundance of legal lobsters based on landings (8,867 mt) is defined as 80% of the median for the period 1984-85 to 2008-09. The metric for assessing where the stock is relative to the USR is the 3-year running mean of landings. For the season ending 2012-13, this metric is 22,155 mt, well above the USR and the highest on record.

The commercial catch-per-unit-effort (CPUE, in kg/trap haul) has increased substantially since 1998-99 and the 2012-13 value is the highest observed. The USR for the abundance of legal size lobsters based on the CPUE (0.62 kg/trap haul) is defined as 80% of the median for the reference period 1998-99 to 2008-09. Again, the measure for assessing where the stock is relative to the USR is the 3-year running mean of the commercial CPUE. The current 3-year running mean is 1.1 kg/trap haul, well above the USR (Figure 3).

Table 1. LFA 34 landings (mt) for fishing seasons from 1998-99 to 2012-13, together with 3-yr running mean.

Fishing Season	Landings	Fishing Season	Landings
1998-99	13,074	2006-07	16,583
1999-00	13,444	2007-08	17,145
2000-01	16,198	2008-09	17,262
2001-02	19,058	2009-10	19,749
2002-03	17,613	2010-11	20,401
2003-04	17,801	2011-12	23,288
2004-05	17,250	2012-13	22,776
2005-06	17,009	**3-yr running mean**	**22,155**

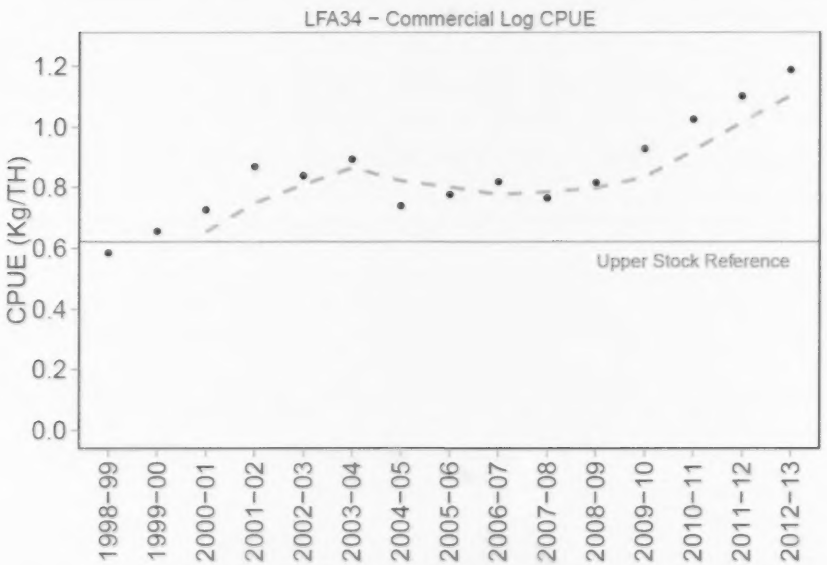

Figure 3. Trend in commercial CPUE (total weight landed/total trap hauls) for available time period together with proposed USR (horizontal line at 0.62 kg/trap haul). USR is based on 80% of the median CPUE from 1998-99 to 2008-09. The dashed line is the 3-year running mean (1.1 after 2012-13 season).

Fishery-Independent Survey

The fishery independent indicator proposed in the last assessment (DFO 2013) was based on the catch rate (number of lobsters/tow) in an existing trawl survey (the "ITQ survey"). This survey was designed for other species but also sampled lobsters. The proposed USR for legal and sublegal lobster abundance based on this survey was 80% of the median catch rate for the period 1996-2009. As for the previous USRs, it was proposed that the 3-year running mean be used as the metric to assess stock status. Figure 4 shows that the 3-year running mean after the 2013 survey is well above the proposed USR.

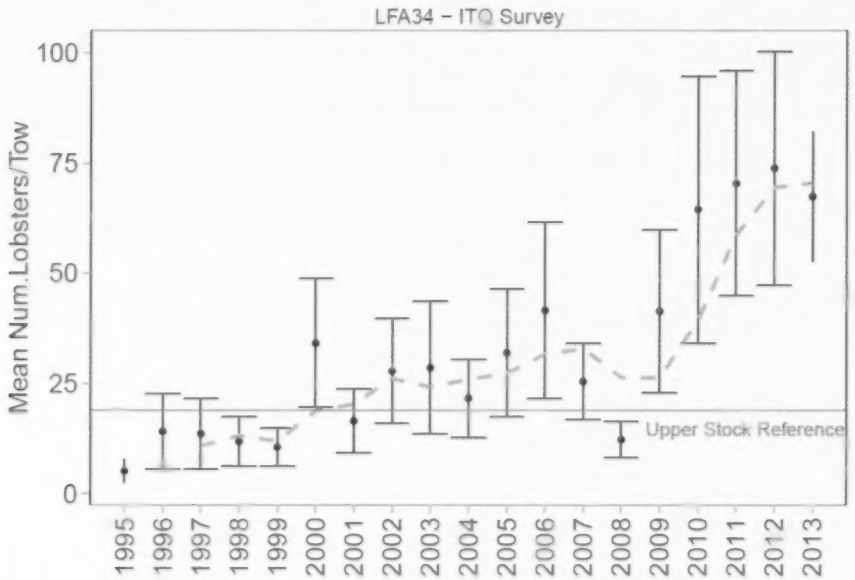

Figure 4. Trend in mean number per tow from the ITQ survey together with the proposed USR (horizontal line at 19.0 lobsters/tow). The USR is calculated as 80% of the median number per tow for 1996-2009, all stations included. Standard error bars are shown for each year. The dashed line is the 3-year running mean.

Recent Developments

The numerical values of the indicator and USR are sensitive to the ITQ stations included in the calculations. In DFO (2013), all stations sampled were included, and within-year averages taken if the same station number was sampled more than once in the survey. In 2013, the ITQ survey began a transition to a lobster-focused survey under the direction of the Maritimes Region's Lobster Unit. Additional stations were sampled in shallower waters, and a substantial number of previously sampled ITQ stations in deeper water were not sampled. To account for this change, the annual catch rate was calculated for 25 stations that were sampled in 2013 and in at least 14 of the 18 years from 1996 to 2013. The USR was adjusted based on this reduced number of stations, by taking 80% of the median from 1996-2009 with the reduced number of stations. The 3-year running mean based on the reduced number of stations was well above the adjusted USR but shows a decline from 2012 (Figure 5). This decline in the 3-yr running mean may be caused by reduced lobster abundance or annual variability in the trawl survey index.

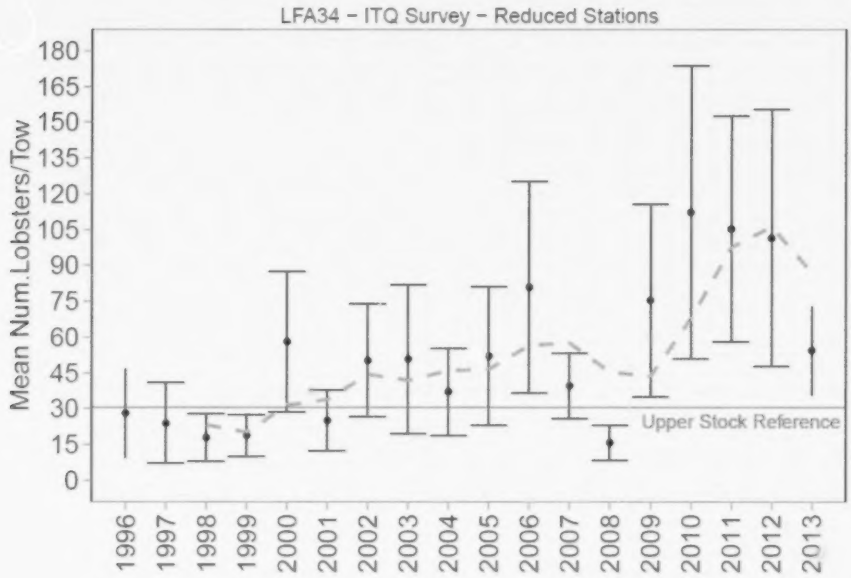

Figure 5. Trend in mean number per tow from the ITQ survey with a reduced number of stations (n=25) to adjust for changes to survey in 2013. Standard error bars are shown for each year. An adjusted USR (horizontal line at 30.6 lobsters/tow) was calculated by taking 80% of the median number per tow for the reduced number of stations. The dashed line is the 3-year running mean.

Conclusions

The lobster stock in LFA 34 at the end of the 2012-13 season (May 31, 2013) was considered to be in the healthy zone based on three abundance indicators (landings, commercial catch rate and trawl survey catch rate). The 3-year running means of these were well above the proposed USRs.

Each of the abundance indicators have strengths and weaknesses that were outlined in the previous assessment. Given that all three are providing similar signals, there is confidence that abundance remains high relative to the 1985-2009 period.

With the transition to a new lobster-focused fishery independent survey, there will be changes in survey design and protocols aimed at improved estimates of lobster abundance. These changes will result in uncertainties when making comparisons with previous years.

Contributors

Name	Affliation
John Tremblay (Lead)	DFO Science, Maritimes
Manon Cassita-Da Ros	DFO Science, Maritimes
Cheryl Denton	DFO Science, Maritimes
Julian Gaudette	DFO Science, Maritimes
Douglas Pezzack	DFO Science, Maritimes
Ben Zisserson (Reviewer)	DFO Science, Maritimes
Lottie Bennett (Chair)	DFO Science, Maritimes
Andrew Newbould	DFO Resource Management, Maritimes
Tana Worcester	DFO Science, Maritimes

Approved by

Alain Vézina
Regional Director of Science
DFO Maritimes Region
Dartmouth, Nova Scotia
Ph. 902-426-3490
Date: May 15, 2014

Sources of Information

DFO. 2012. Reference points consistent with the precautionary approach for a variety of stocks in the Maritimes Region. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2012/035.

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Tremblay, M.J., Pezzack, D.S., Gaudette, J., Denton, C., Cassista-Da Ros, M., and Allard, J. 2013. Assessment of lobster (Homarus americanus) off southwest Nova Scotia and in the Bay of Fundy (Lobster Fishing Areas 34-38). DFO Can. Sci. Advis. Sec. Res. Doc. 2013/078. viii + 125 p.

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Centre for Science Advice (CSA)
Maritimes Region
Fisheries and Oceans Canada
PO Box 1006, 1 Challenger Drive
Dartmouth, Nova Scotia
Canada B2Y 4A2

Telephone: 902 426-7070
Fax: 902 426-5435
E-Mail: XMARMRAP@dfo-mpo.gc.ca
Internet address: www.dfo-mpo.gc.ca/csas-sccs/

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